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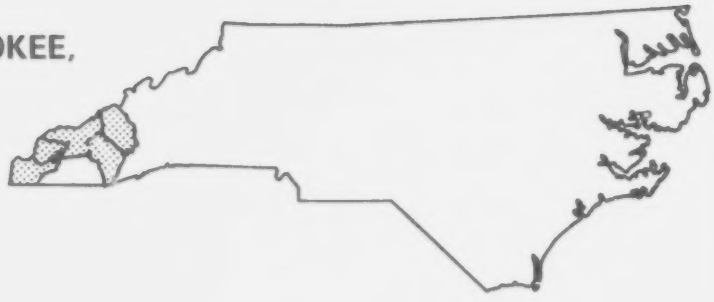
FLOOD INSURANCE STUDY

EASTERN BAND OF CHEROKEE INDIANS, NORTH CAROLINA

SWAIN, JACKSON, GRAHAM, CHEROKEE, AND HAYWOOD COUNTIES



MAY 17, 1989

Federal Emergency Management Agency

COMMUNITY NUMBER - 370401

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

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FLOOD INSURANCE STUDY

EASTERN BAND OF CHEROKEE INDIANS,
GRAHAM, CHEROKEE, JACKSON, SWAIN, AND HAYWOOD COUNTIES,
NORTH CAROLINA

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the Eastern Band of Cherokee Indians Reservation, Graham, Cherokee, Jackson, Swain, and Haywood Counties, North Carolina, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates and assist the community in its efforts to promote sound floodplain management. Minimum floodplain management requirements for participation in the National Flood Insurance Program are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the state (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were performed by the Tennessee Valley Authority (TVA) (the Study Contractor) for the Federal Emergency Management Agency (FEMA), under Inter-Agency Agreement No. EMW-84-E-1549, Project Order No. 1. This study was completed in July 1986.

1.3 Coordination

Streams requiring detailed study were identified at a meeting in February 1984, attended by representatives of the Study Contractor, FEMA, and the Eastern Band of Cherokee Indians.

On June 30, 1988, the results of this Flood Insurance Study were reviewed and accepted at a final coordination meeting attended by representatives of the Study Contractor, FEMA, and the community.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the Eastern Band of Cherokee Indians, Graham, Cherokee, Jackson, Swain, and Haywood Counties, North Carolina. The area of study is shown on the Vicinity Map (Figure 1).

Flooding caused by overflow of the Oconaluftee River, Soco Creek, and Raven Fork was studied in detail.

Areas having low development potential or minimal flood hazards were previously studied using approximate analyses. The results were shown on the Flood Hazard Boundary Map for the Eastern Band of Cherokee Indians, North Carolina; and in the Flood Insurance Studies for Swain and Graham Counties, North Carolina (References 1-3) and are incorporated into this Flood Insurance Study.

The areas studied were selected with priority given to all known flood hazard areas and areas of projected development or proposed construction through July 1991. The scope and methods of study were proposed to and agreed upon by FEMA and the Eastern Band of Cherokee Indians.

2.2 Community Description

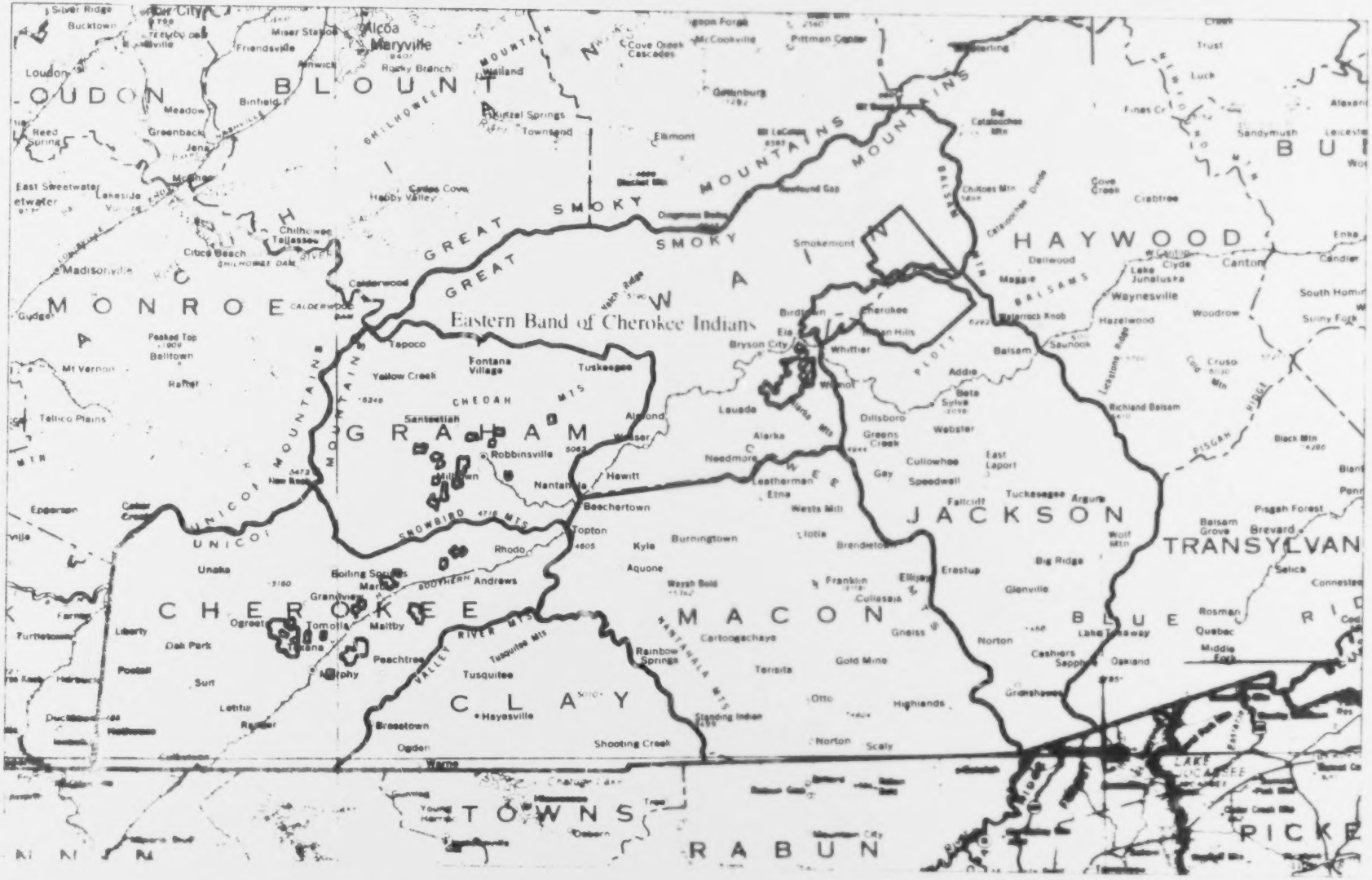
The area of the Eastern Band of Cherokee Indians totals approximately 80 square miles in five mountainous, western North Carolina counties: Graham, Cherokee, Jackson, Swain, and Haywood. Most of the area is in Jackson and Swain Counties, with a small piece extending into Haywood County, and a number of scattered tracts are in undeveloped areas of Graham and Cherokee Counties. The reservation is served by the Blue Ridge Parkway, U.S. Route 19, and U.S. Route 441.

Most development is in or around the Town of Cherokee in Swain County. Cherokee serves as the eastern gateway to the Great Smoky Mountain National Park. Most development is tourist-oriented, including motels, campgrounds, and craft shops along both Soco Creek and the Oconaluftee River. Development in the Raven Fork area is beginning, primarily in the form of campgrounds.

Average monthly temperatures in the region range from 85 degrees Fahrenheit (^{o}F) in the summer to 38 ^{o}F in the winter. The average annual precipitation is 50 inches (Reference 4).

2.3 Principal Flood Problems

The principal sources of flood problems affecting the Eastern Band of Cherokee Indians Reservation are the Oconaluftee River, Raven Fork, and Soco Creek.



FEDERAL EMERGENCY MANAGEMENT AGENCY

EASTERN BAND OF CHEROKEE INDIANS, NC

CHEROKEE, GRAHAM, HAYWOOD, JACKSON, AND SWAIN COS.

APPROXIMATE SCALE

VICINITY MAP

The two largest floods on the Oconaluftee River since at least 1901 occurred in November 1906 and March 1913. Upstream of the confluence of Soco Creek, the 1906 and 1913 floods were about equal. At the stream gage at Cherokee, these floods reached an elevation of 1,951.4 feet National Geodetic Vertical Datum of 1929 (NGVD), with an estimated discharge and recurrence interval of about 21,500 cubic feet per second (cfs) and 60 years, respectively (References 5 and 6).

The third largest flood since 1901 on the Oconaluftee River occurred on December 30, 1969. At Cherokee, it was nearly as high as the 1913 flood (Reference 7). At the stream gage at Birdtown, it reached an elevation of 1,855.76 feet NGVD, with an estimated discharge and recurrence interval of about 15,900 cfs and 15 years, respectively. Several buildings were surrounded by water, roads were flooded and scoured, and the site of a new community center was flooded.

Other regional floods occurred on March 16, 1973; March 6, 1963; and January 7, 1946. At the stream gage at Cherokee, the 1946 flood reached an elevation of 1,949.9 feet NGVD, with an estimated discharge and recurrence interval of 11,200 cfs and 15 years, respectively. At the stream gage at Birdtown, the 1973, 1963, and 1946 floods reached elevations of 1,855.6 feet NGVD, 1,855.3 feet NGVD, and 1,855.2 feet NGVD, with estimated discharges of 15,600 cfs, 15,000 cfs, and 15,000 cfs, respectively. The estimated recurrence intervals of these floods were between 8 and 10 years.

On Raven Fork at the TVA gage near Cherokee, the 1969 flood reached an elevation of 2,159.0 feet NGVD, with an estimated discharge and recurrence interval of 9,000 cfs and 100 years, respectively. Damage was limited to scour along roads (Reference 7).

Information about past flooding on Soco Creek is limited to floodmarks that are not compatible with present conditions due to channel changes that have occurred since the mid-1950s (References 5 and 6).

2.4 Flood Protection Measures

Flood protection measures are not known to exist within the study area.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude that is expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10-, 2-, 1-, and 0.2-percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long-term <u>average</u> period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood that equals or exceeds the 100-year flood (1-percent chance of annual exceedence) in any

50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for each riverine flooding source studied in detail affecting the community.

The principal sources of data used to define peak discharge-frequency relationships for the Oconaluftee River were the gages at Birdtown (period of record 1946, 1949-1985) and Cherokee (period of record 1922-1949). Frequency curves for the gages were computed according to the procedures outlined in Bulletin 17B (Reference 8) and were adjusted based on historical information. The peak discharge values for the 10-, 50-, 100-, and 500-year floods at various points along the river were determined by interpolation or extrapolation using the values determined at the gages.

Regional relationships developed by the U.S. Geological Survey (USGS) (Reference 9) were verified and used to estimate the 10-, 50-, and 100-year peak discharge values for Raven Fork and Soco Creek. The 500-year peak discharge values for Raven Fork and Soco Creek were estimated by extrapolating from the 10-, 50-, and 100-year values and by using a regional relationship of 500-year peak discharge and drainage area that resulted from a regression analysis of stream gage records on watersheds with hydrometeorological characteristics similar to those in the watersheds of the studied streams. An analysis of historic flooding information for Raven Fork and the reach of Soco Creek downstream of the downstream crossing of U.S. Route 19 revealed that it is consistent with the peak discharge-frequency relationships determined for those two streams.

Peak discharge-drainage area relationships for the 10-, 50-, 100-, and 500-year floods of each flooding source studied in detail in the community are shown in Table 1.

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (SQ MILES)	PEAK DISCHARGE (CFS) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
OCONALUFTEE RIVER					
at mouth	188	15,300	21,300	24,100	31,100
just downstream of Soco Creek	179	14,500	20,300	23,000	29,800
just upstream of Soco Creek	134	10,300	15,000	17,200	22,900
just upstream of Raven Fork	52.4	9,700	14,200	16,300	21,800

TABLE 1 - SUMMARY OF DISCHARGES (Continued)

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (SQ MILES)	PEAK DISCHARGE (CFS) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
RAVEN FORK					
at mouth	74.3	5,700	9,100	10,900	15,000
just downstream of Bunches Branch	64.2	5,200	8,300	9,900	13,700
just upstream of Bunches Branch	48.0	4,200	6,900	8,300	11,500
just upstream of Straight Fork	23.2	2,600	4,300	5,200	7,400
SOCO CREEK					
at mouth	44.9	4,100	6,600	7,900	11,000
just upstream of Shoal Creek	38.8	3,700	6,000	7,200	10,100
just upstream of Wrights Creek	27.8	2,900	4,800	5,800	8,200

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

Cross sections and backwater-producing structures were obtained by field survey and from aerial photography prepared by the TVA (Reference 10).

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles and on the Flood Insurance Rate Map. River miles shown are established by the TVA and may not represent actual measured stream distances.

Channel roughness factors (Manning's "n") used in the hydraulic computations were determined on the basis of field inspection of the channel and floodplain areas, previous studies by the TVA, and computed coefficients based on known flood profiles.

ROUGHNESS COEFFICIENTS

Stream	Channel	Overbank
Oconaluftee River	0.040-0.055	0.05-0.13
Raven Fork	0.045-0.070	0.07-0.20
Soco Creek	0.045-0.065	0.04-0.15

Water-surface elevations of floods of the selected recurrence intervals were computed using the HEC-2 step-backwater computer program (Reference 11). Flood profiles were drawn showing computed water-surface elevations for floods of the selected recurrence intervals. In cases where the 50- and 100-year flood elevations are close together, due to limitations of the profile scale, only the 100-year profile has been shown. Starting water-surface elevations for all detailed study streams were calculated by the slope-area method. Flood depths at selected locations on approximate study streams were determined by the slope-area method.

The hydraulic analyses for this study are based on the effects of unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

All elevations are referenced to the NGVD. Elevation reference marks used in this study are shown on the map and described in the exhibit labeled Elevation Reference Marks.

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program encourages State and local governments to adopt sound floodplain management programs. Therefore, each Flood Insurance Study provides 100-year flood elevations and delineations of the 100- and 500-year floodplain boundaries and 100-year floodway to assist communities in developing floodplain management measures.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1-percent annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2-percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For each stream studied in detail, the 100- and 500-year floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using TVA topographic maps at a scale of 1:4800 with contour intervals of 4 and 5 feet (Reference 12).

The 100-year and 500-year floodplain boundaries are shown on the Flood Insurance Rate Map. On this map, the 100-year floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A, AE, AH, AO, A99, V, and VE) and the 500-year floodplain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 100- and 500-year floodplain boundaries are close together, only the 100-year floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

For the streams studied by approximate methods, only the 100-year floodplain boundary was delineated using the Flood Hazard Boundary Map for the Eastern Band of Cherokee Indians (Reference 1), slope-area calculations, and USGS topographic maps at a scale of 1:24000 with a contour interval of 40 feet (Reference 13).

4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces the flood-carrying capacity, increases the flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 100-year floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum Federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this study are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodways presented in this study were designed for optimum benefit to the community. Floodway analyses were based on equal conveyance reduction and adjusted as necessary to account for the effects of existing development and to provide functional and manageable floodways. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations are tabulated for selected cross sections and are shown in Table 2, Floodway Data. The computed floodways are shown on the Flood Insurance Rate Map. In cases where the floodway and the 100-year floodplain boundaries are either close together or collinear, only the floodway boundary is shown. Portions of the floodways for Soco Creek and the Oconaluftee River lie outside the corporate limits.

Along streams where floodways have not been computed, the community must ensure that the cumulative effect of development in the floodplain will not cause more than a 1.0-foot increase in the base flood elevations at any point within the community.

The area between the floodway and the 100-year floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood by more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 2.

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET)
OCONALUFTEE RIVER								
A	11,200	155[2]	2495	9.6	1846.0	1846.0	1846.2	0.2
B	12,750	145	2795	8.5	1849.0	1849.0	1849.3	0.3
C	14,200	250	3200	7.4	1851.8	1851.8	1852.3	0.5
D	16,650	250	3201	7.4	1859.5	1859.5	1860.5	1.0
E	16,900	170	2816	8.4	1860.2	1860.2	1861.0	0.8
F	17,980	160	2350	10.0	1863.2	1863.2	1864.0	0.8
G	19,400	210	2965	7.9	1869.2	1869.2	1870.0	0.8
H	19,800	190	2142	11.0	1870.3	1870.3	1871.3	1.0
I	20,840	180	2830	8.3	1875.6	1875.6	1876.0	0.4
J	21,750	255	3129	7.4	1878.2	1878.2	1878.7	0.5
K	22,060	140	1792	13.0	1879.3	1879.3	1879.7	0.4
L	23,570	185	2528	9.2	1888.7	1888.7	1889.5	0.8
M	25,340	155	2258	10.3	1896.4	1896.4	1897.0	0.6
N	26,150	160	2514	9.2	1900.5	1900.5	1900.8	0.3
O	27,800	480[2]	3961	5.8	1907.0	1907.0	1907.2	0.2
P	30,020	420	4181	5.5	1914.3	1914.3	1915.3	1.0
Q	31,520	200	2462	7.0	1919.1	1919.1	1920.0	0.9
R	32,800	125	1724	9.9	1923.4	1923.4	1923.9	0.5
S	34,380	140	1866	9.2	1930.2	1930.2	1930.9	0.7
T	34,640	175	2015	8.5	1931.5	1931.5	1932.5	1.0
U	35,800	135	1588	10.7	1937.2	1937.2	1937.5	0.3
V	36,190	155	1644	10.3	1939.8	1939.8	1939.8	0.0
W	36,400	140	1700	10.0	1942.0	1942.0	1942.0	0.0
X	36,500	140	1757	9.7	1942.4	1942.4	1942.4	0.0
Y	37,600	455	4414	3.8	1945.8	1945.8	1946.1	0.3
Z	39,190	220	2429	6.9	1951.1	1951.1	1951.4	0.3

[1] FEET ABOVE MOUTH
[2] THIS WIDTH EXTENDS BEYOND EASTERN BAND OF CHEROKEE INDIANS BOUNDARY

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

EASTERN BAND OF CHEROKEE INDIANS, NC
(SWAIN, JACKSON, GRAHAM, CHEROKEE, AND HAYWOOD COS.)

FLOODWAY DATA

OCONALUFTEE RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET)
OCONALUFTEE RIVER								
AA	39,820	190	2061	8.2	1953.8	1953.8	1954.6	0.8
AB	41,050	180	1801	9.3	1957.3	1957.3	1957.9	0.6
AC	41,460	160	1794	9.3	1960.8	1960.8	1961.1	0.3
AD	42,420	160	1624	10.3	1964.3	1964.3	1964.6	0.3
AE	42,720	200	1766	9.5	1966.0	1966.0	1966.3	0.3
AF	43,710	240	2331	7.2	1970.0	1970.0	1970.3	0.3
AG	43,960	200	2279	7.3	1970.6	1970.6	1970.8	0.2
AH	45,120	375	2629	6.3	1976.4	1976.4	1977.0	0.6
AI	46,350	360	3991	4.2	1980.2	1980.2	1981.2	1.0
AJ	47,120	250	2491	6.6	1985.9	1985.9	1986.6	0.7
AK	47,600	200	2454	6.7	1986.8	1986.8	1987.3	0.5
AL	48,000	155[2]	2046	8.1	1987.5	1987.5	1988.0	0.5
AM	48,700	250[2]	2336	7.1	1989.8	1989.8	1990.6	0.8
AN	49,160	250[2]	2354	7.0	1993.3	1993.3	1994.0	0.7
AO	50,800	185[2]	2086	7.9	1999.2	1999.2	1999.9	0.7
AP	51,640	255[2]	2324	7.1	2003.7	2003.7	2004.2	0.5
AQ	51,800	420[2]	3079	5.3	2004.3	2004.3	2005.3	1.0

[1]FEET ABOVE MOUTH
[2]THIS WIDTH EXTENDS BEYOND EASTERN BAND OF CHEROKEE INDIANS BOUNDARY

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

EASTERN BAND OF CHEROKEE INDIANS, NC
(SWAIN, JACKSON, GRAHAM, CHEROKEE, AND HAYWOOD COS.)

FLOODWAY DATA

OCONALUFTEE RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET)
SOCO CREEK								
A	870	120	1039	7.6	1918.8	1918.8	1918.8	0.0
B	1125	120	1024	7.7	1919.4	1919.4	1919.4	0.0
C	1430	160	1356	5.8	1922.3	1922.3	1923.0	0.7
D	1900	120	935	8.4	1924.3	1924.3	1924.7	0.4
E	2210	90	808	9.7	1925.7	1925.7	1926.5	0.8
F	2310	70[2]	624	12.6	1926.1	1926.1	1926.8	0.7
G	2820	90[2]	843	9.3	1931.3	1931.3	1931.4	0.1
H	3190	140[2]	1487	5.3	1935.2	1935.2	1936.1	0.9
I	3465	150[2]	1154	6.8	1935.8	1935.8	1936.7	0.9
J	4400	160[2]	1293	6.1	1940.6	1940.6	1941.6	1.0
K	5175	250[2]	661	10.9	1945.9	1945.9	1945.9	0.0
L	6090	150[2]	1093	6.6	1953.1	1953.1	1954.0	0.9
M	6630	130[2]	815	8.8	1958.0	1958.0	1958.4	0.4
N	7600	180[2]	1461	4.9	1970.1	1970.1	1970.1	0.0
O	8600	100[2]	687	10.5	1975.5	1975.5	1975.9	0.4
P	9600	280	1648	4.4	1983.1	1983.1	1984.0	0.9
Q	10,050	110	607	11.9	1989.1	1989.1	1990.0	0.9
R	10,725	100	797	8.9	1993.8	1993.8	1994.0	0.2
S	11,380	150	1025	6.9	1999.7	1999.7	2000.6	0.9
T	11,910	70	520	13.7	2002.8	2002.8	2003.3	0.5
U	12,750	120	758	9.3	2013.4	2013.4	2013.7	0.3
V	13,500	110	766	9.2	2020.8	2020.8	2021.7	0.9
W	14,140	60	700	10.1	2028.0	2028.0	2028.3	0.3
X	14,900	70	668	10.5	2034.8	2034.8	2035.4	0.6
Y	16,000	100	821	8.6	2044.4	2044.4	2045.2	0.8
Z	17,820	190	1307	4.4	2067.2	2067.2	2068.0	0.8

[1] FEET ABOVE MOUTH
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TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

EASTERN BAND OF CHEROKEE INDIANS, NC
(SWAIN, JACKSON, GRAHAM, CHEROKEE, AND HAYWOOD COS.)

FLOODWAY DATA

SOCO CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET)
SOCO CREEK								
AA	18,820	70	529	10.9	2073.3	2073.3	2973.7	0.4
AB	20,000	60	604	9.5	2091.9	2091.9	2092.6	0.7
AC	21,100	70	735	7.6	2102.4	2102.4	2102.8	0.4
AD	21,630	80	485	11.6	2109.7	2109.7	2109.8	0.1
AE	22,030	250	1593	3.5	2121.7	2121.7	2122.7	1.0
AF	22,730	290	1005	5.6	2127.1	2127.1	2127.9	0.8
AG	23,180	240	1245	4.4	2131.9	2131.9	2132.9	1.0
AH	23,850	110	939	5.9	2142.0	2142.0	2142.9	0.9
AI	24,720	80	733	7.5	2145.6	2145.6	2146.3	0.7
AJ	25,320	70	642	8.6	2150.1	2150.1	2150.2	0.1
AK	26,240	70	375	14.7	2163.6	2163.6	2163.6	0.0
AL	26,950	90	448	12.0	2188.8	2188.8	2189.0	0.2
AM	28,200	90	634	8.5	2206.0	2206.0	2206.7	0.7
AN	28,950	90	480	11.0	2217.5	2217.5	2217.8	0.3
AO	29,520	140	807	6.5	2225.8	2225.8	2226.5	0.7
AP	30,100	120	598	8.8	2234.0	2234.0	2234.9	0.9
AQ	30,980	180	635	8.1	2250.6	2250.6	2251.4	0.8
AR	31,580	190	691	7.5	2261.0	2261.0	2261.2	0.2
AS	31,860	110	820	6.3	2269.0	2269.0	2269.6	0.6
AT	32,510	80	535	9.6	2275.8	2275.8	2276.3	0.5
AU	33,550	220	924	5.5	2295.9	2295.9	2296.6	0.7
AV	34,150	130	613	8.2	2306.9	2306.9	2307.7	0.8
AW	34,740	80	427	11.7	2319.2	2319.2	2319.2	0.0

[1]FEET ABOVE MOUTH

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

EASTERN BAND OF CHEROKEE INDIANS, NC
(SWAIN, JACKSON, GRAHAM, CHEROKEE, AND HAYWOOD COS.)

FLOODWAY DATA

SOCO CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET)
RAVEN FORK								
A	9010	90	735	14.7	2098.9	2098.9	2098.9	0.0
B	9650	115	1408	7.7	2105.7	2105.7	2106.5	0.8
C	12,020	80	771	13.9	2132.5	2132.5	2132.8	0.3
D	13,810	100	994	10.8	2155.7	2155.7	2156.2	0.5
E	14,430	205	1576	6.7	2160.9	2160.9	2161.9	1.0
F	15,680	105	912	11.6	2170.5	2170.5	2170.7	0.2
G	16,980	95	1137	9.3	2181.3	2181.3	2181.7	0.4
H	18,100	160	1411	7.5	2187.7	2187.7	2188.1	0.4
I	18,960	310	1724	6.1	2193.3	2193.3	2194.2	0.9
J	19,960	220	1106	9.5	2203.4	2203.4	2203.9	0.5
K	20,960	135	1100	9.5	2218.1	2218.1	2218.3	0.2
L	21,780	145	1462	7.1	2225.4	2225.4	2226.4	1.0
M	23,420	95	974	10.6	2232.3	2232.3	2232.9	0.6
N	24,970	100	1175	8.8	2247.4	2247.4	2247.4	0.0
O	26,770	170	1287	8.0	2266.6	2266.6	2266.6	0.0
P	27,900	130	1061	9.7	2274.9	2274.9	2275.1	0.2
Q	29,400	125	893	11.4	2288.7	2288.7	2289.0	0.3
R	29,960	120	865	14.8	2295.0	2295.0	2295.1	0.1
S	30,480	105	789	12.8	2302.1	2302.1	2302.1	0.0
T	31,310	105	1019	9.9	2310.8	2310.8	2311.3	0.5
U	31,920	130	962	10.5	2317.1	2317.1	2317.3	0.2
V	32,700	105	1303	7.7	2326.5	2326.5	2327.5	1.0
W	33,220	120	1313	7.7	2328.2	2328.2	2328.9	0.7
X	33,710	125	1002	10.0	2332.1	2332.1	2332.5	0.4
Y	34,100	120	1245	8.0	2335.8	2335.8	2336.2	0.4
Z	34,700	135	858	11.7	2342.4	2342.4	2342.6	0.2

[1]FEET ABOVE MOUTH

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

EASTERN BAND OF CHEROKEE INDIANS, NC
(SWAIN, JACKSON, GRAHAM, CHEROKEE, AND HAYWOOD COS.)

FLOODWAY DATA

RAVEN FORK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET)
RAVEN FORK								
AA	35,575	270	1301	7.7	2354.0	2354.0	2354.0	0.0
AB	36,410	80	696	14.3	2363.0	2363.0	3263.1	0.1
AC	37,460	120	1187	8.4	2376.7	2376.7	2377.1	0.4
AD	38,130	170	1329	7.4	2383.5	2383.5	2384.4	0.9
AE	39,080	170	929	8.9	2390.2	2390.2	2390.4	0 2
AF	41,260	110	743	11.1	2416.0	2416.0	2416.0	0.0
AG	43,130	70	835	9.9	2452.4	2452.4	2452.9	0.5
AH	43,320	95	685	7.6	2456.3	2456.3	2456.8	0.5
AI	44,075	90	565	9.2	2462.0	2462.0	2462.0	0.2
AJ	45,200	150	733	7.1	2473.8	2473.8	2473.9	0.1
AK	46,120	105	642	7.9	2488.9	2488.9	2488.9	0.0
AL	47,000	100	456	11.1	2499.1	2499.1	2499.1	0.0
AM	47,650	90	641	7.9	2507.8	2507.8	2508.2	0.4
AN	48,200	95	679	7.4	2513.0	2513.0	2513.5	0.5
AO	48,780	100	533	9.4	2520.1	2520.1	2520.2	0.1
AP	49,940	140	930	5.4	2561.9	2561.9	2562.3	0.4
AQ	50,740	100	438	11.4	2575.1	2575.1	2575.5	0.4
AR	51,360	95	538	9.3	2590.3	2590.3	2591.2	0.9
AS	51,930	95	643	7.6	2602.6	2602.6	2602.7	0.1
AT	53,610	90	423	11.3	2638.3	2638.3	2638.3	0.0

[1]FEET ABOVE MOUTH

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

EASTERN BAND OF CHEROKEE INDIANS, NC

(SWAIN, JACKSON, GRAHAM, CHEROKEE, AND HAYWOOD COS.)

FLOODWAY DATA

RAVEN FORK

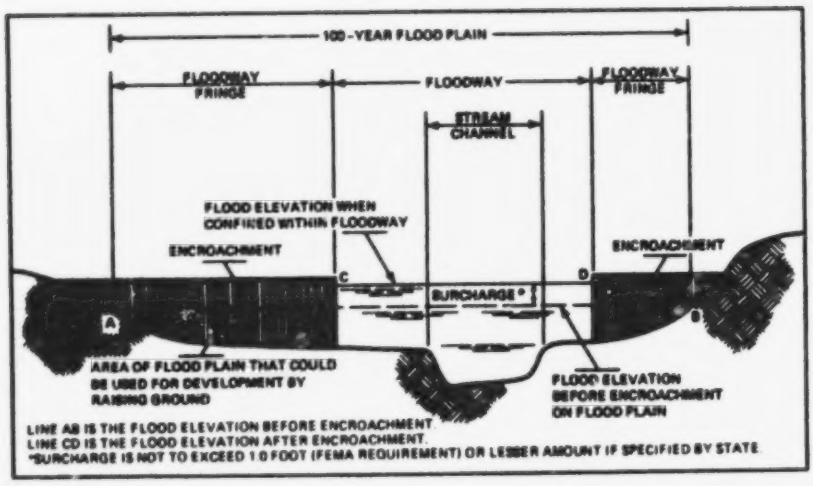
100-YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
SURCHARGE*
A
B
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN
LINE AB IS THE FLOOD ELEVATION BEFORE ENCROACHMENT
LINE CD IS THE FLOOD ELEVATION AFTER ENCROACHMENT.
*SURCHARGE IS NOT TO EXCEED 1.0 FOOT (FEMA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE

FIGURE 2 - Floodway Schematic

5.0 INSURANCE APPLICATION

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. These zones are as follows:

Zone A

Zone A is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations or depths are shown within this zone.

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by detailed methods. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 100-year floodplain, areas of 100-year flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 100-year flood by levees. No base flood elevations or depths are shown within this zone.

6.0 FLOOD INSURANCE RATE MAP

The Flood Insurance Rate Map is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 100-year floodplains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols the 100- and 500-year floodplains, the floodways, and the locations of selected cross sections used in the hydraulic analyses and floodway computations.

7.0 OTHER STUDIES

A floodplain information report and Supplement No. 1 to that report were prepared by the TVA (References 5 and 6) and contain flood information on both Soco Creek and the Oconaluftee River. That flood information was used in developing this study.

Flood Insurance Studies published for Swain and Graham Counties, North Carolina (References 2 and 3) are in agreement with this study.

Flood Insurance Studies in progress for Cherokee and Jackson Counties, North Carolina (References 14 and 15) are in agreement with this study.

This Flood Insurance Study supersedes the previously printed Flood Hazard Boundary Map for the Eastern Band of Cherokee Indians, North Carolina (Reference 1).

8.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this study can be obtained by contacting the Natural and Technological Hazards Division, FEMA, 1371 Peachtree Street, NE., Suite 736, Atlanta, Georgia 30309.

9.0 REFERENCES AND BIBLIOGRAPHY

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14. Federal Emergency Management Agency, Flood Insurance Study, Cherokee County, Unincorporated Areas, North Carolina, in progress.

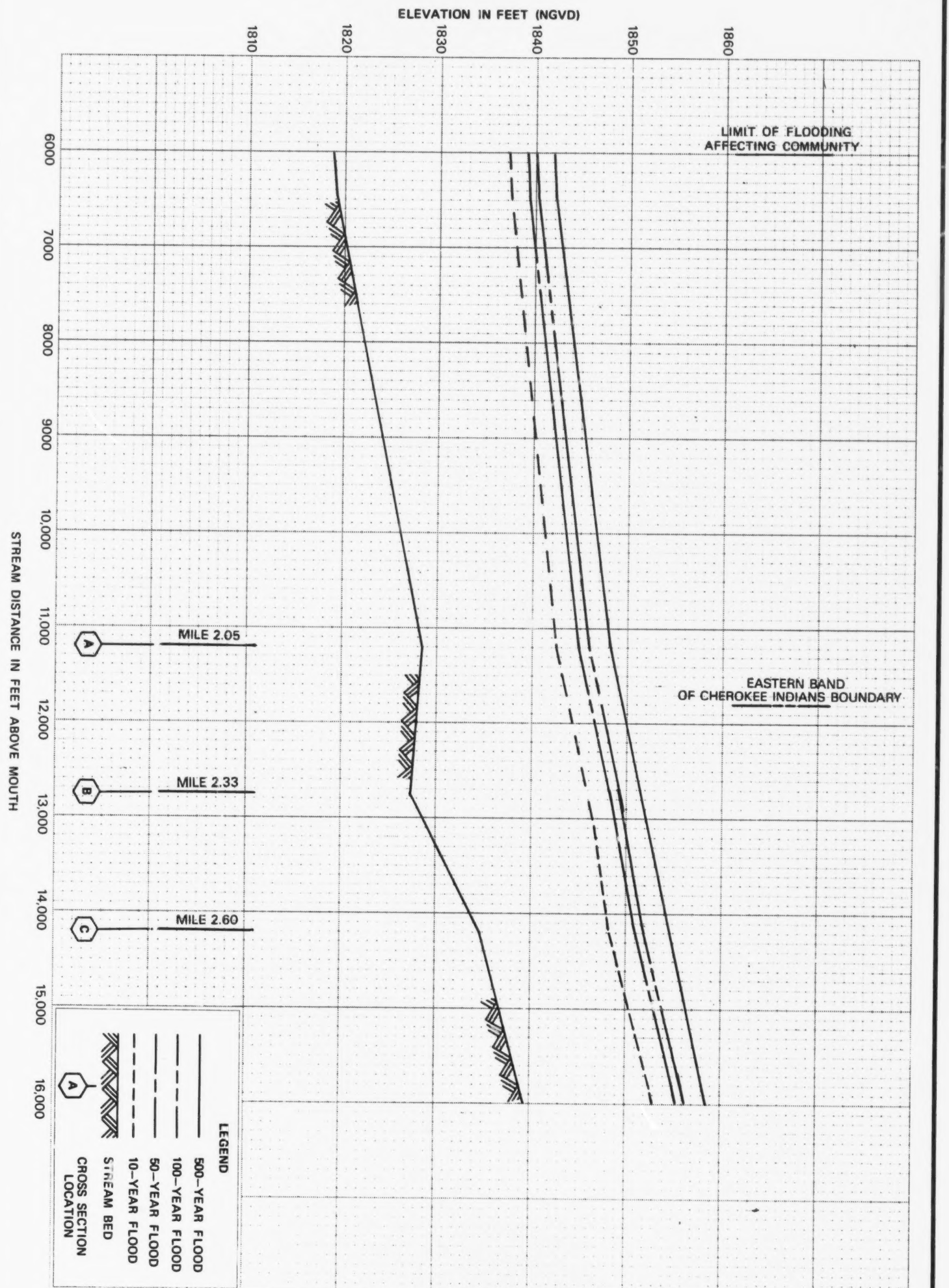
15. ————, Flood Insurance Study, Jackson County, Unincorporated Areas, North Carolina, in progress.

ELEVATION REFERENCE MARKS

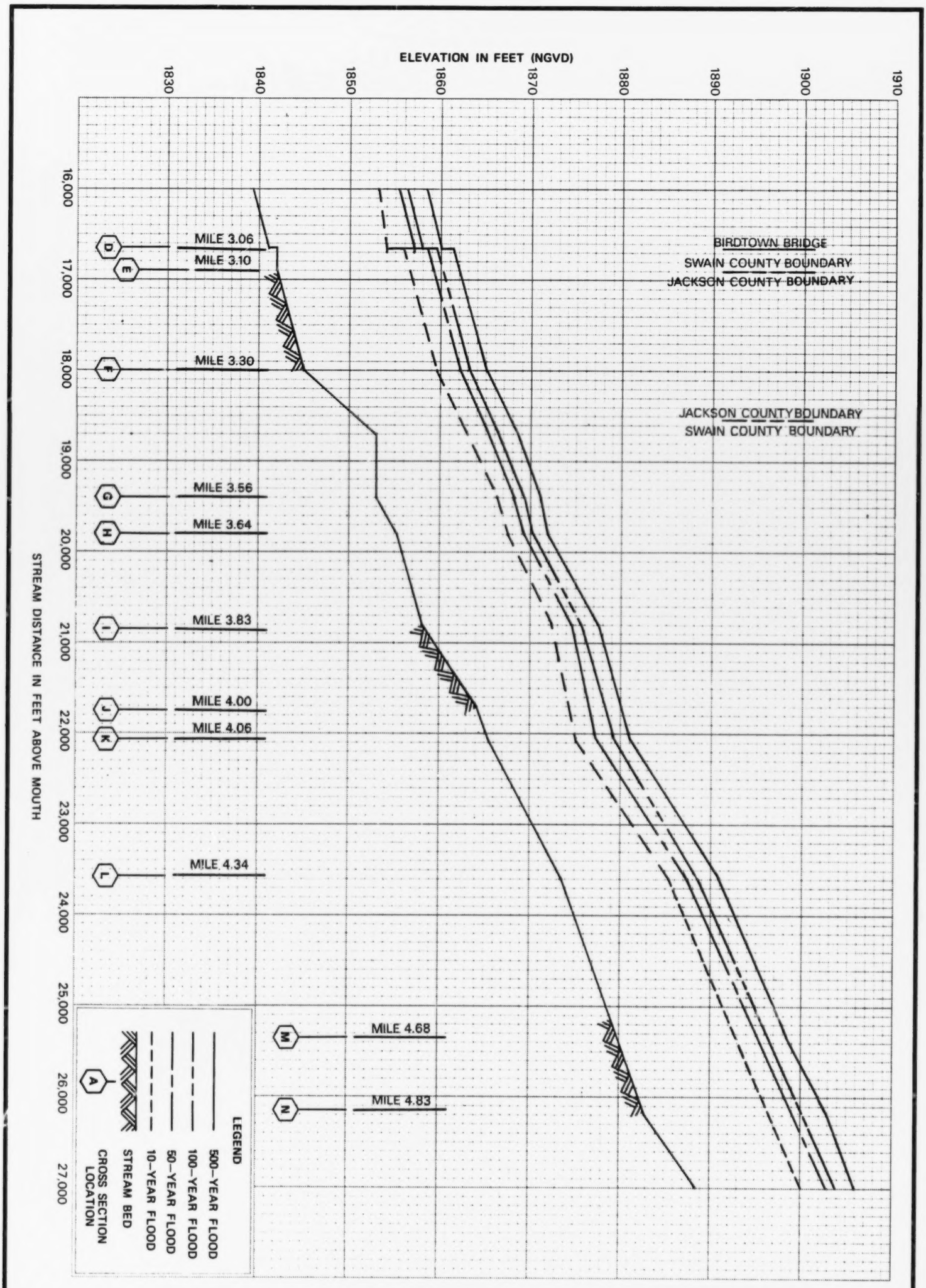
REFERENCE MARK	FLOOD INSURANCE RATE MAP PANEL	ELEVATION (FEET NGVD)	DESCRIPTION OF LOCATION
1	0050	1,804.26	standard TVA brass tablet set in downstream northwest wingwall of bridge over the Oconaluftee River, about 0.9 mile east of intersection of U.S. Route 19 and SR 1168
2	0013	1,871.02	downstream corner of gas pump island at service station on right bank of the Oconaluftee River, just north of McCoy Branch Road in Birdtown
3	0013	1,890.31	standard TVA brass tablet set on headwall of culvert under U.S. Route 19 located 0.5 mile east along U.S. Route 19 from Owl Branch Road, on right bank of the Oconaluftee River, 18 feet north of centerline of highway
4	0012	1,983.92	standard TVA brass tablet set in concrete on upstream left bank end of sidewalk of Acquoni Road bridge over the Oconaluftee River
5	0004	2,160.10	standard TVA brass tablet set in concrete on downstream right bank wingwall of Unnamed Road bridge over Raven Fork about 2.3 miles north on Big Cove Road from intersection of Blue Ridge Parkway
6	0004	2,269.44	standard TVA brass tablet set in concrete on inside corner of sidewalk in front of Big Cove Baptist Church
7	0006	2,385.28	standard TVA brass tablet set in concrete on downstream right bank wingwall of Bunches Creek Road bridge over Raven Fork

ELEVATION REFERENCE MARKS (Continued)

REFERENCE MARK	FLOOD INSURANCE RATE MAP PANEL	ELEVATION (FEET NGVD)	DESCRIPTION OF LOCATION
8	0006	2,491.70	standard TVA brass tablet set in concrete on side of first step of entrance to Straight Fork Baptist Church
9	0006	2,603.37	standard TVA brass tablet set in concrete on upstream left bank wingwall of bridge over Raven Fork at end of Big Cove Road
10	0014	1,954.38	standard TVA brass tablet set in concrete in end of sidewalk of Unnamed Road over the Oconaluftee River on downstream right bank about 0.6 mile North on Big Cove Road from intersection of U.S. Route 19 and U.S. Route 441
11	0014	1,990.59	standard TVA tablet set in concrete post located about 500 feet northwest of eastern junction of U.S. Route 19 and U.S. Route 441, on north side of highway approximately 180 feet from centerline
12	0014	2,020.45	standard TVA brass tablet set in concrete on creekside corner of entranceway to motel, on left bank of Soco Creek 0.75 mile west of intersection of Wrights Creek Road and U.S. Route 19
13	0014	2,140.17	standard TVA brass tablet set in concrete on downstream right wingwall of Unnamed Road bridge over Soco Creek, on road that intersects U.S. Route 19 about 0.5 mile east of intersection of U.S. Route 19 and Old Mission Road
14	0018	2,270.45	standard TVA brass tablet set in concrete on downstream left bank wingwall of Unnamed Road bridge over Soco Creek road that intersects U.S. Route 19 about 1,500 feet west of Washington Creek Road



01P	FEDERAL EMERGENCY MANAGEMENT AGENCY **EASTERN BAND OF CHEROKEE INDIANS, NC** (SWAIN, JACKSON, GRAHAM, CHEROKEE, AND HAYWOOD COS.)	**FLOOD PROFILES** **OCONALUFTEE RIVER**



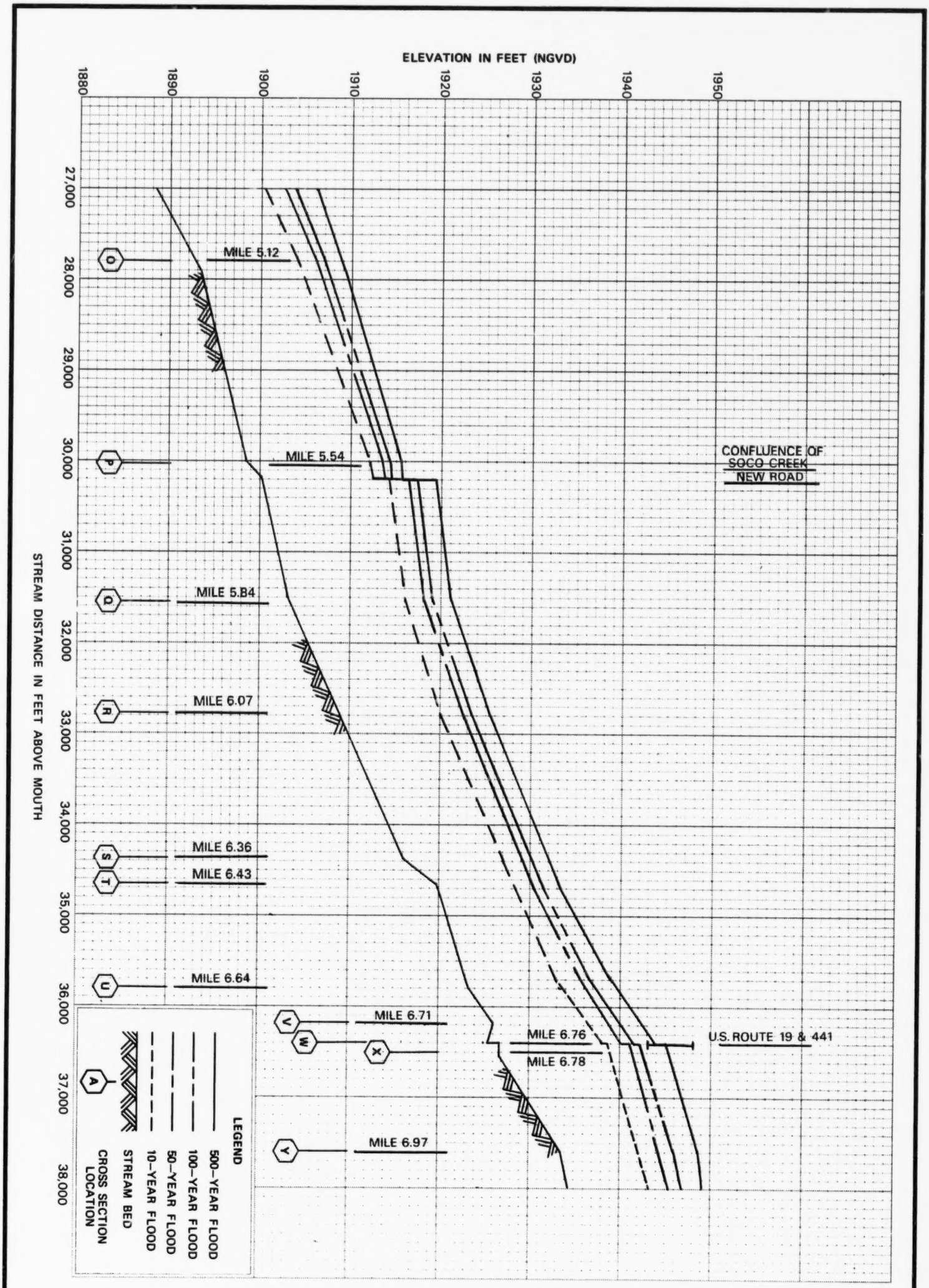
02P

FEDERAL EMERGENCY MANAGEMENT AGENCY

EASTERN BAND OF CHEROKEE INDIANS, NC
(SWAIN, JACKSON, GRAHAM, CHEROKEE, AND HAYWOOD COS.)

FLOOD PROFILES

OCONALUFTEE RIVER



03P

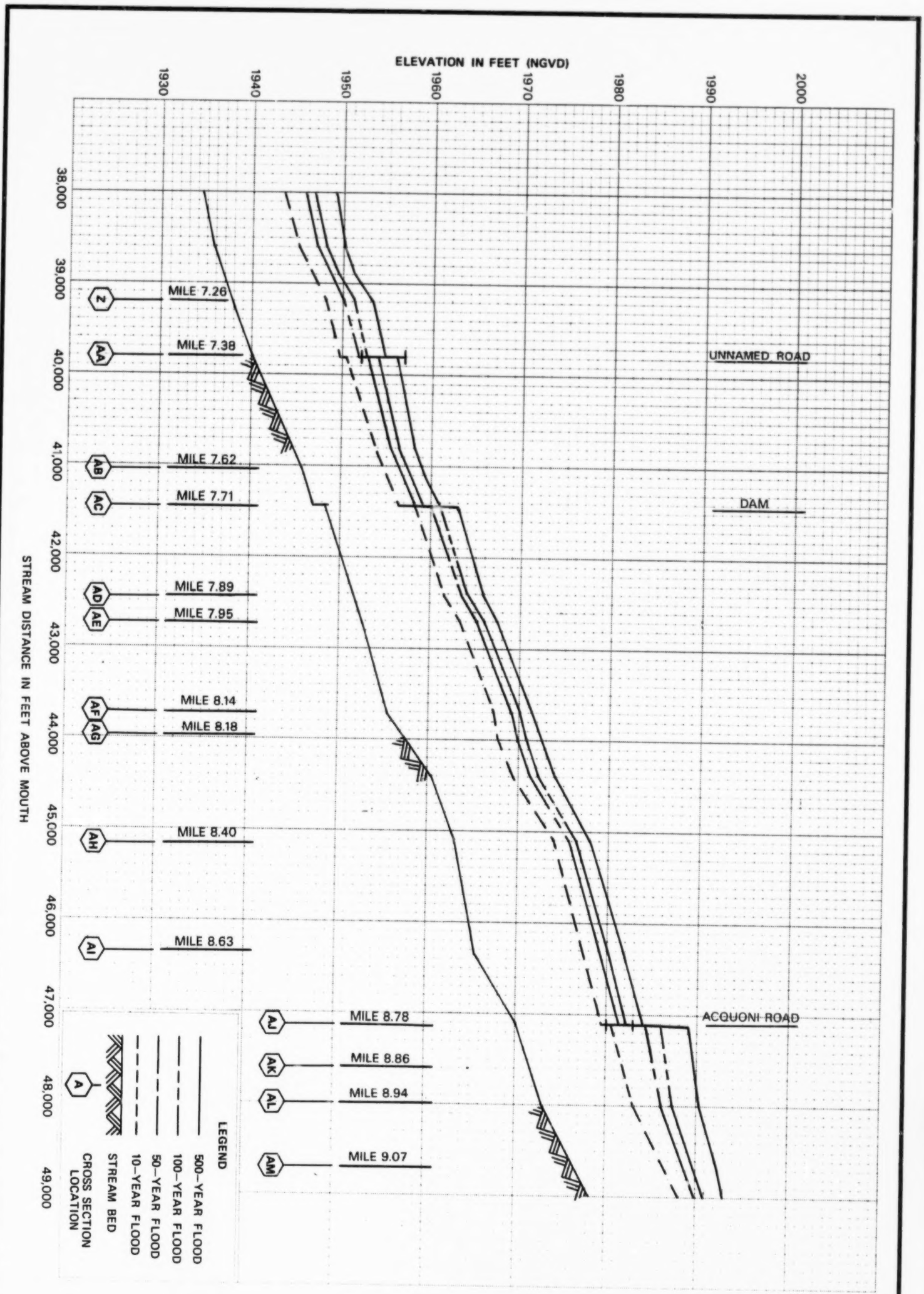
FEDERAL EMERGENCY MANAGEMENT AGENCY

EASTERN BAND OF CHEROKEE INDIANS, NC

(SWAIN, JACKSON, GRAHAM, CHEROKEE, AND HAYWOOD COS.)

FLOOD PROFILES

OCONALUFTEE RIVER



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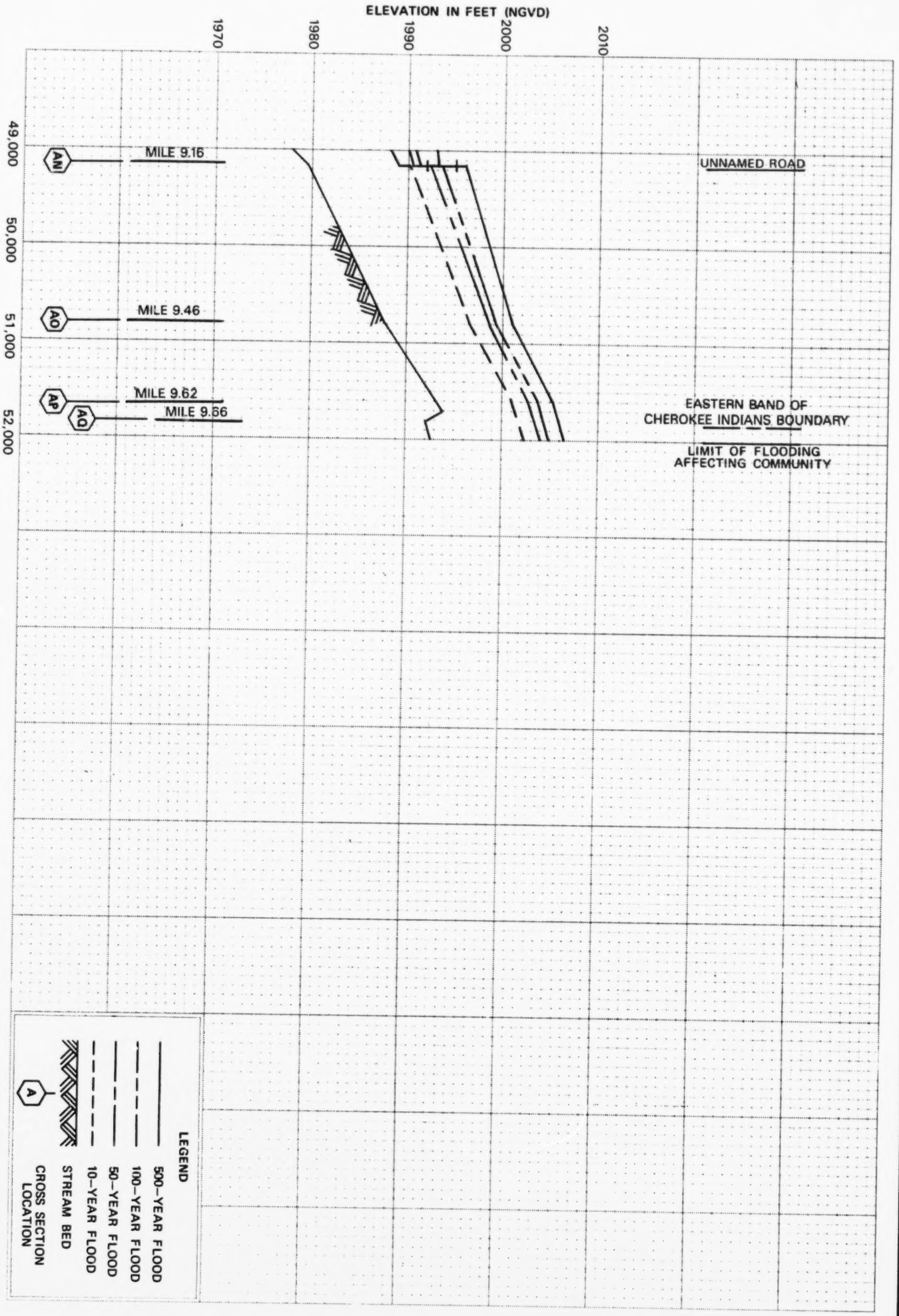
04P	FEDERAL EMERGENCY MANAGEMENT AGENCY **EASTERN BAND OF CHEROKEE INDIANS, NC** (SWAIN, JACKSON, GRAHAM, CHEROKEE, AND HAYWOOD COS.)	**FLOOD PROFILES** **OCONALUFTEE RIVER**



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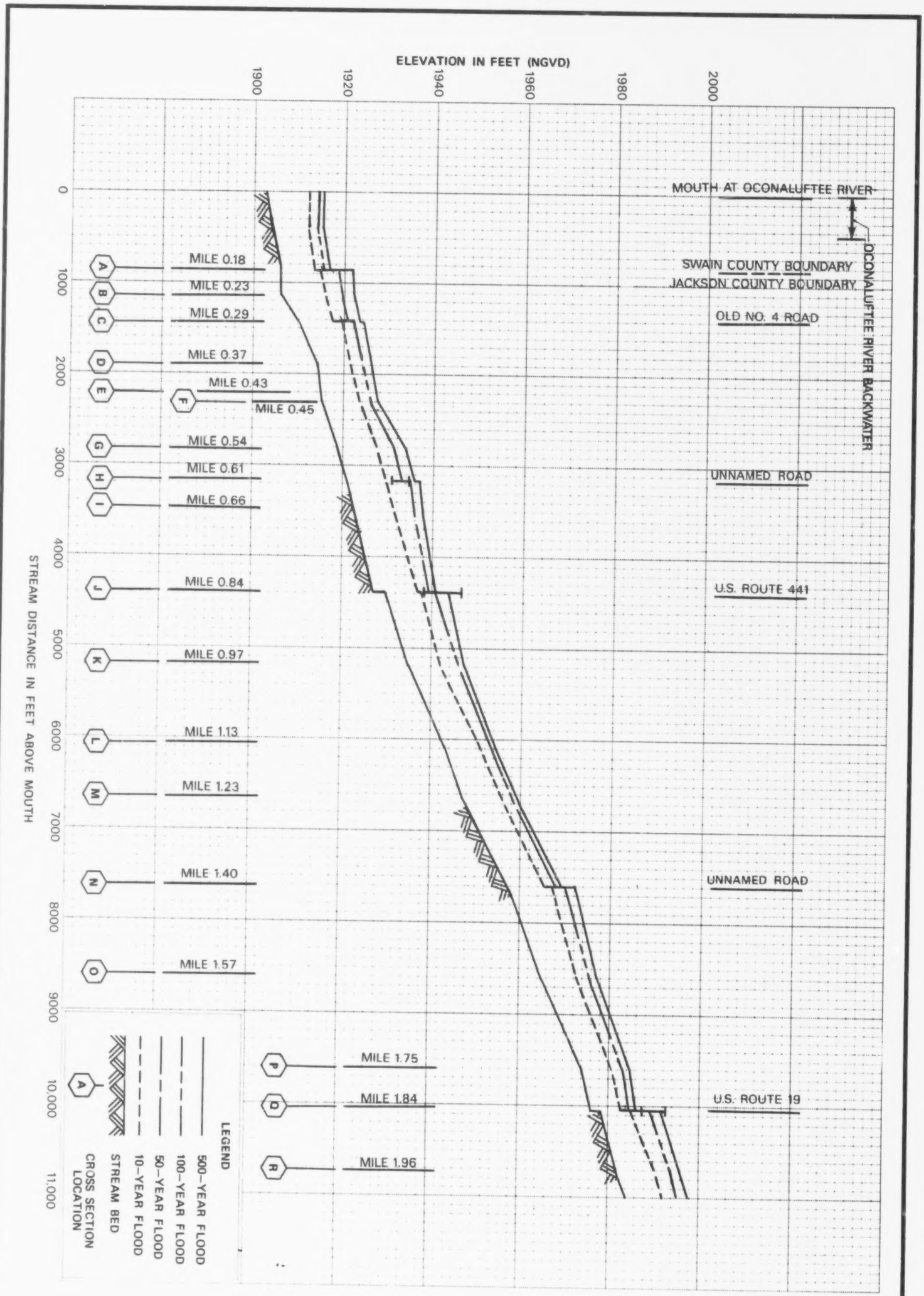
FEDERAL EMERGENCY MANAGEMENT AGENCY

EASTERN BAND OF CHEROKEE INDIANS, NC

(SWAIN, JACKSON, GRAHAM, CHEROKEE, AND HAYWOOD COS.)

FLOOD PROFILES

OCONALUFTEE RIVER



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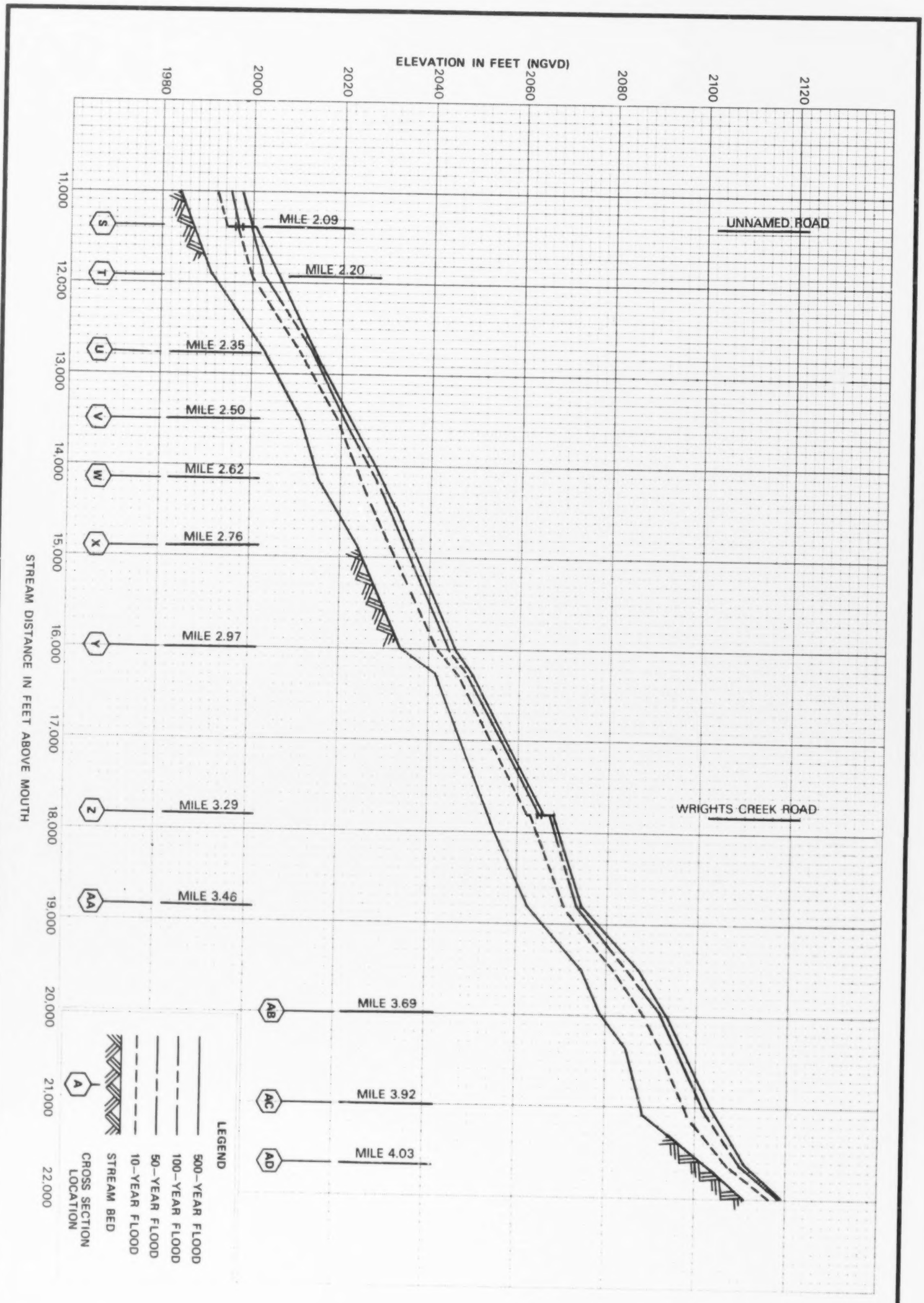

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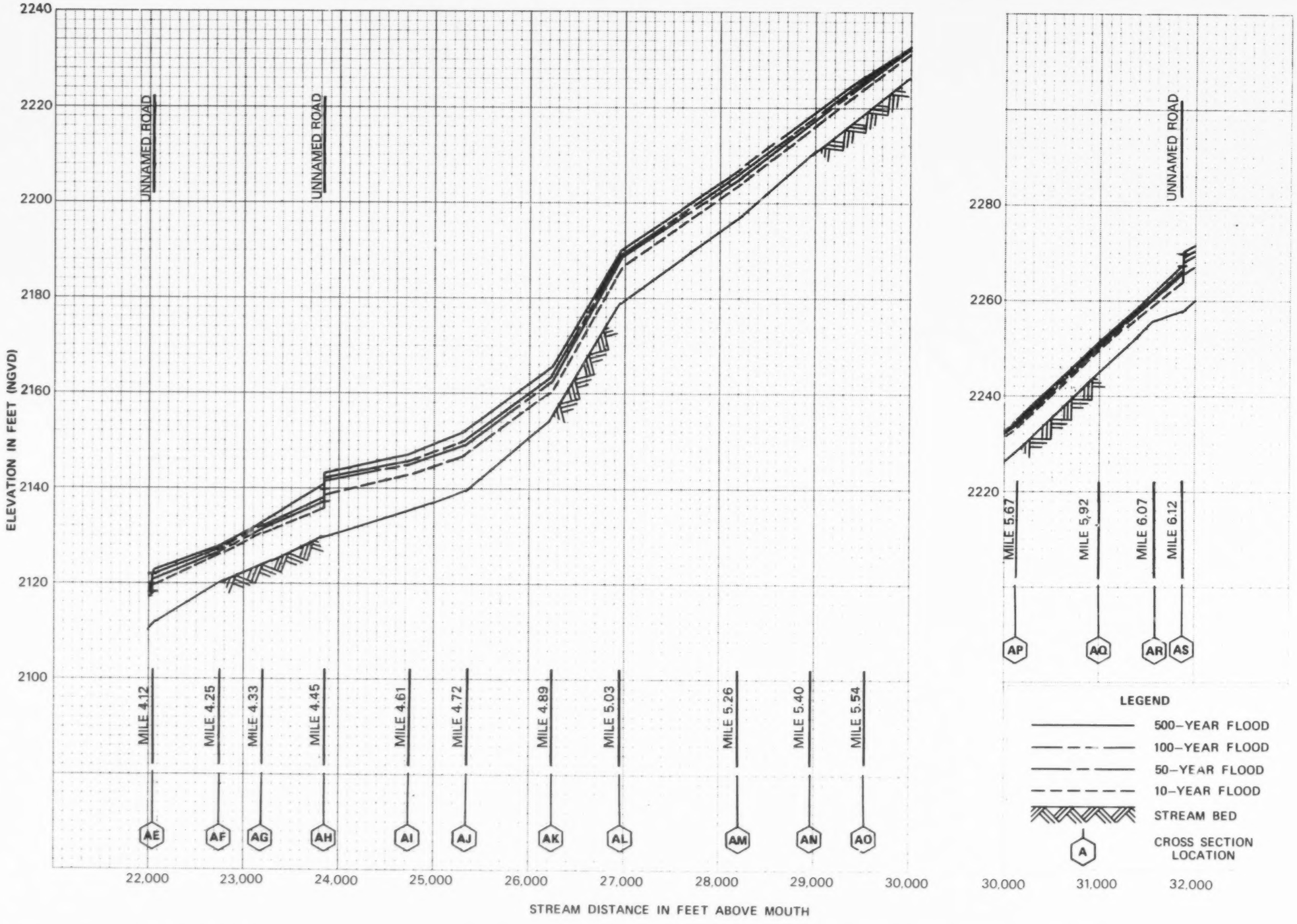
FEDERAL EMERGENCY MANAGEMENT AGENCY

EASTERN BAND OF CHEROKEE INDIANS, NC

(SWAIN, JACKSON, GRAHAM, CHEROKEE, AND HAYWOOD COS.)

FLOOD PROFILES

SOCO CREEK



FLOOD PROFILES

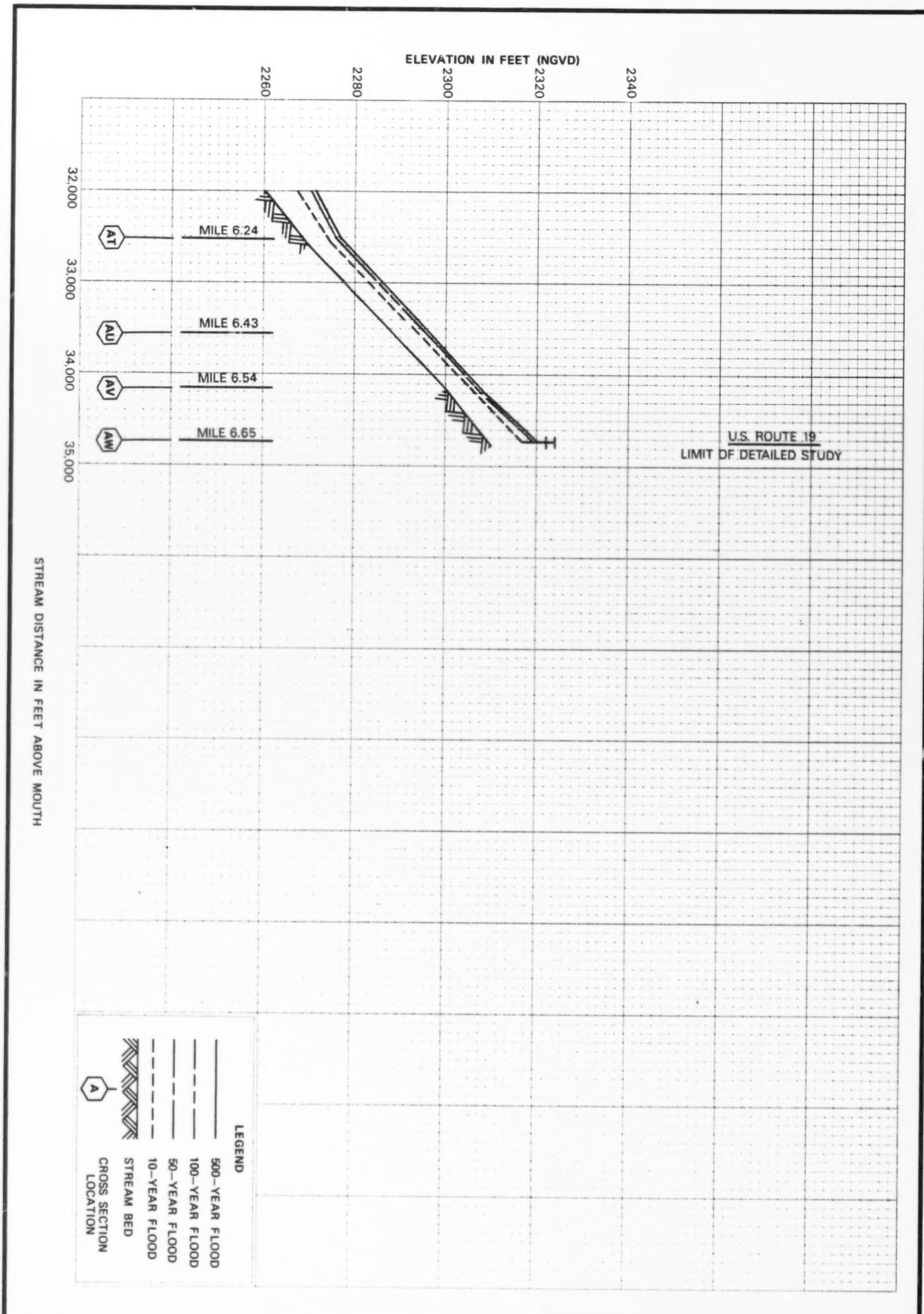
SOCO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

EASTERN BAND OF CHEROKEE INDIANS, NC

(SWAIN, JACKSON, GRAHAM, CHEROKEE, AND HAYWOOD COS.)

08P



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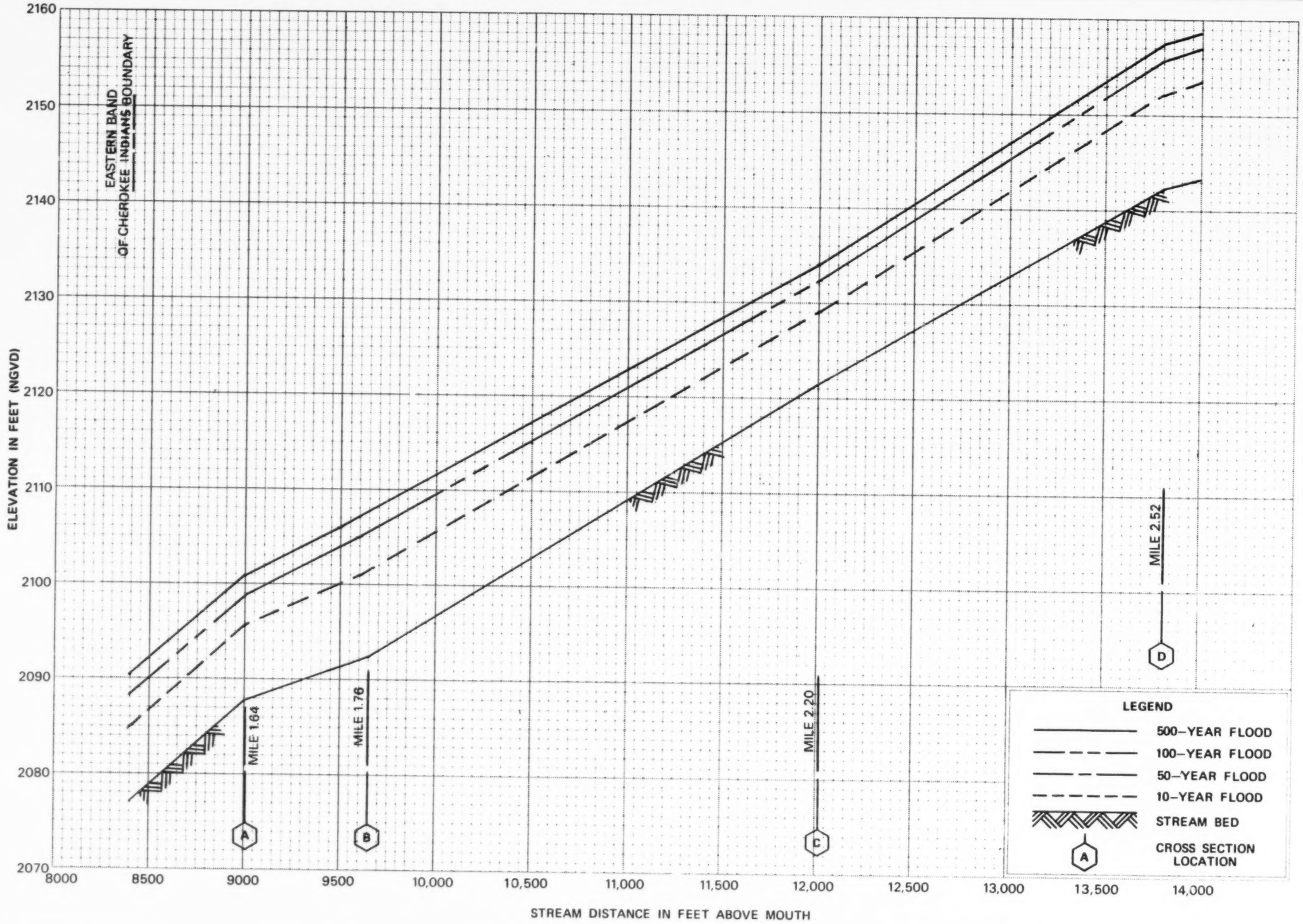
FEDERAL EMERGENCY MANAGEMENT AGENCY

EASTERN BAND OF CHEROKEE INDIANS, NC
(SWAIN, JACKSON, GRAHAM, CHEROKEE, AND HAYWOOD COS.)

FLOOD PROFILES

SOCO CREEK



FLOOD PROFILES

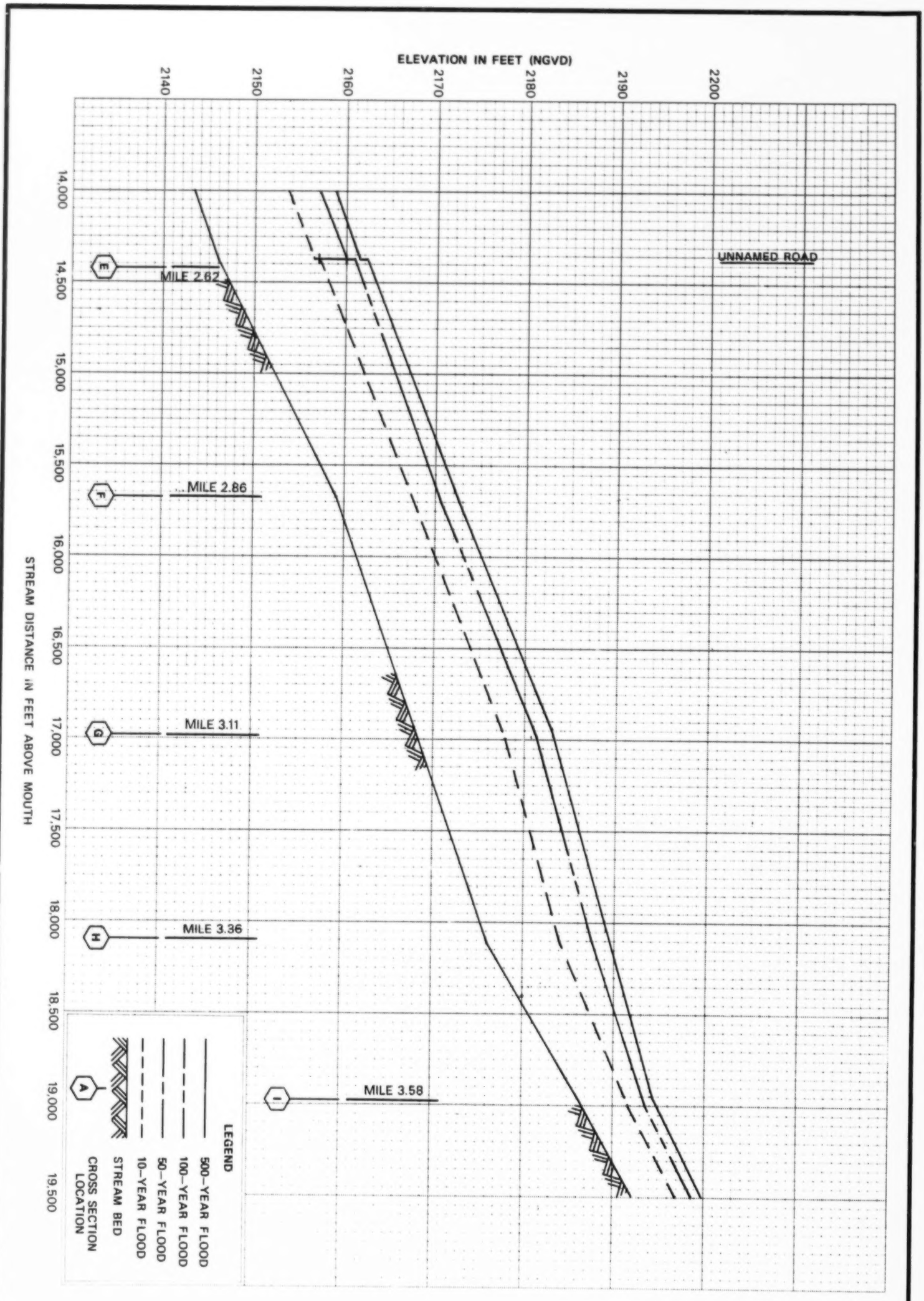
RAVEN FORK

FEDERAL EMERGENCY MANAGEMENT AGENCY

EASTERN BAND OF CHEROKEE INDIANS, NC

(SWAIN, JACKSON, GRAHAM, CHEROKEE, AND HAYWOOD COS.)

10P



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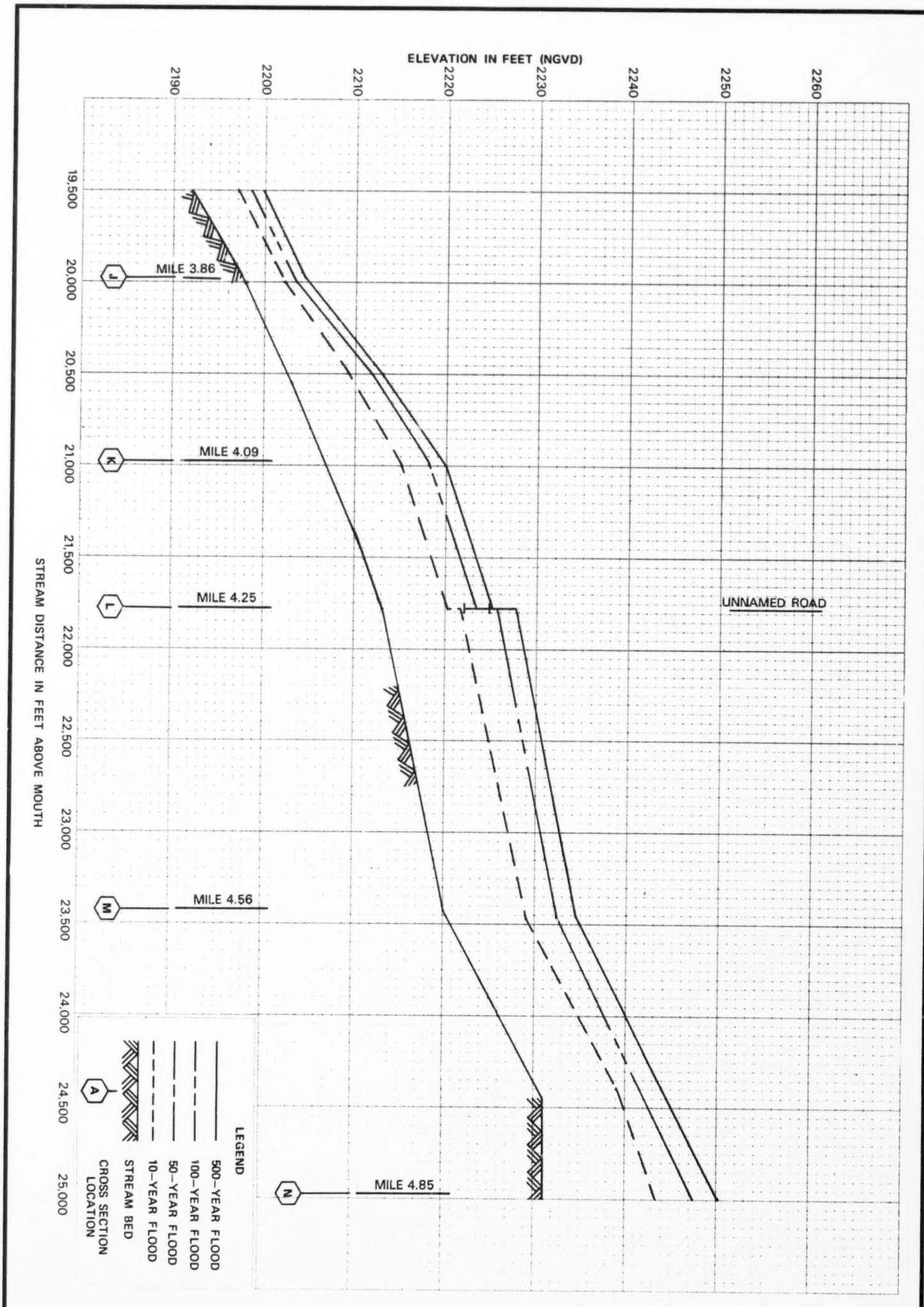
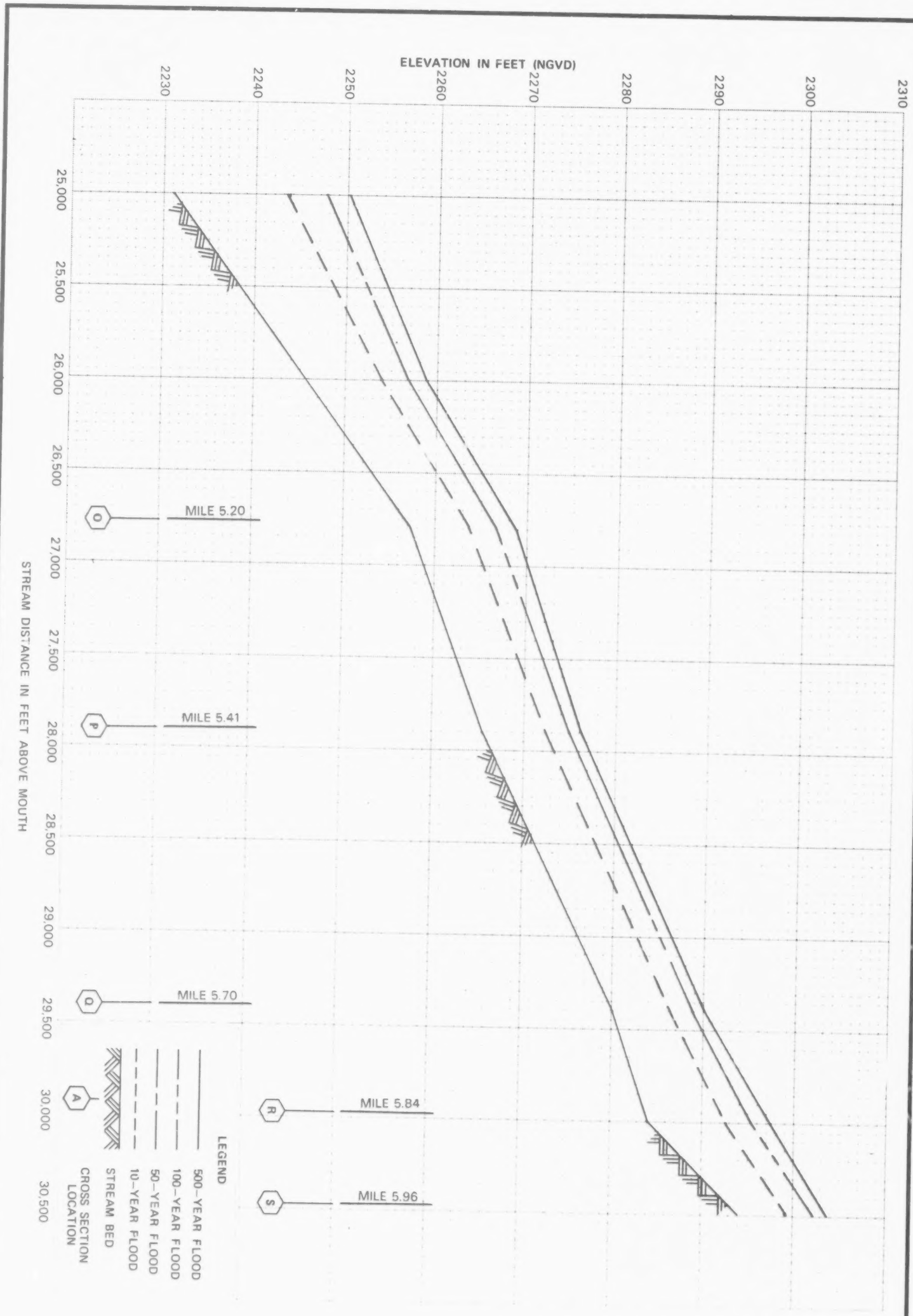
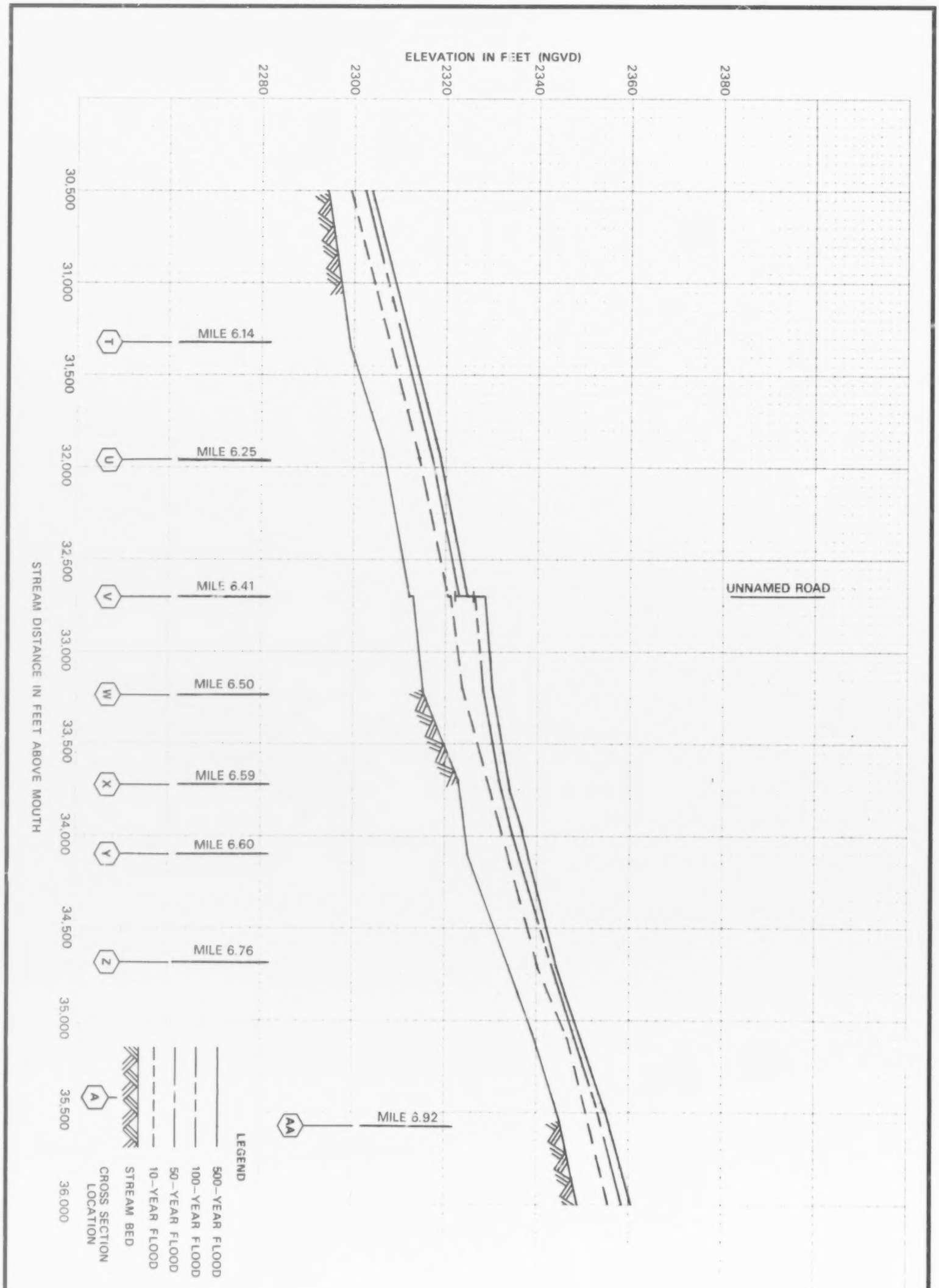


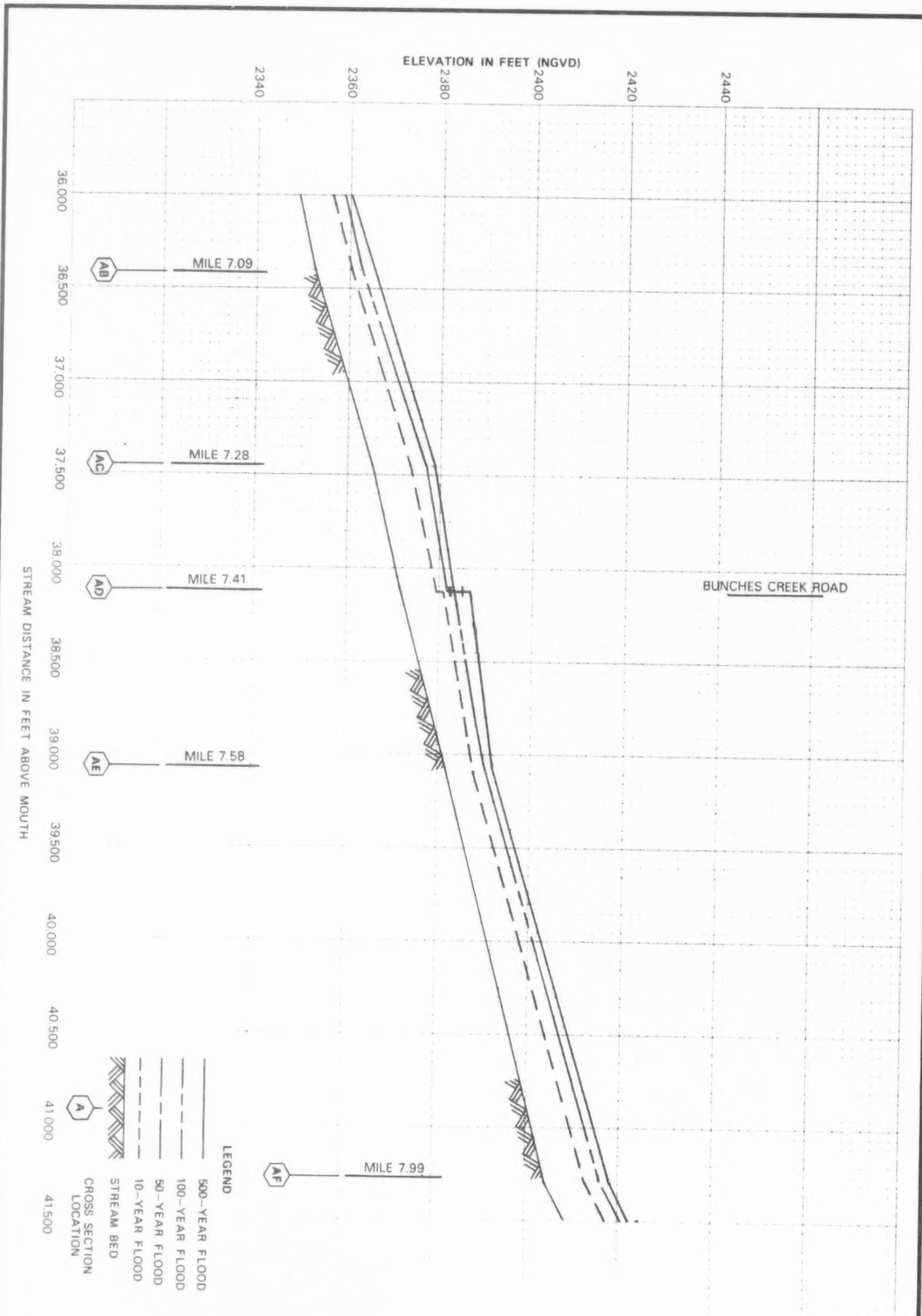
12P	FEDERAL EMERGENCY MANAGEMENT AGENCY **EASTERN BAND OF CHEROKEE INDIANS, NC** (SWAIN, JACKSON, GRAHAM, CHEROKEE, AND HAYWOOD COS.)	**FLOOD PROFILES** **RAVEN FORK**



13P	FEDERAL EMERGENCY MANAGEMENT AGENCY EASTERN BAND OF CHEROKEE INDIANS, NC (SWAIN, JACKSON, GRAHAM, CHEROKEE, AND HAYWOOD COS.)	FLOOD PROFILES RAVEN FORK



14P	FEDERAL EMERGENCY MANAGEMENT AGENCY EASTERN BAND OF CHEROKEE INDIANS, NC (SWAIN, JACKSON, GRAHAM, CHEROKEE, AND HAYWOOD COS.)	FLOOD PROFILES RAVEN FORK



15P

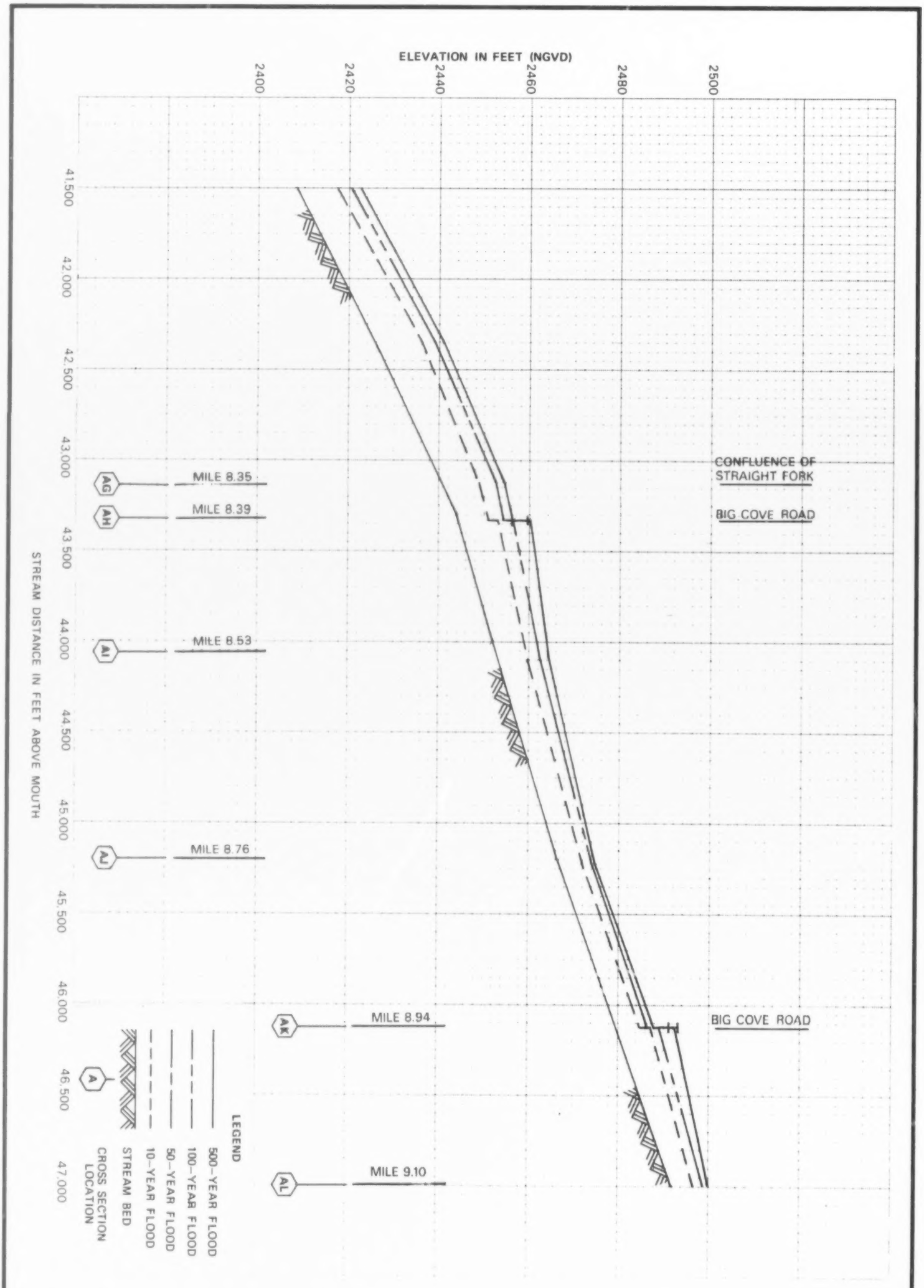
FEDERAL EMERGENCY MANAGEMENT AGENCY

EASTERN BAND OF CHEROKEE INDIANS, NC

(SWAIN, JACKSON, GRAHAM, CHEROKEE, AND HAYWOOD COS.)

FLOOD PROFILES

RAVEN FORK



16P

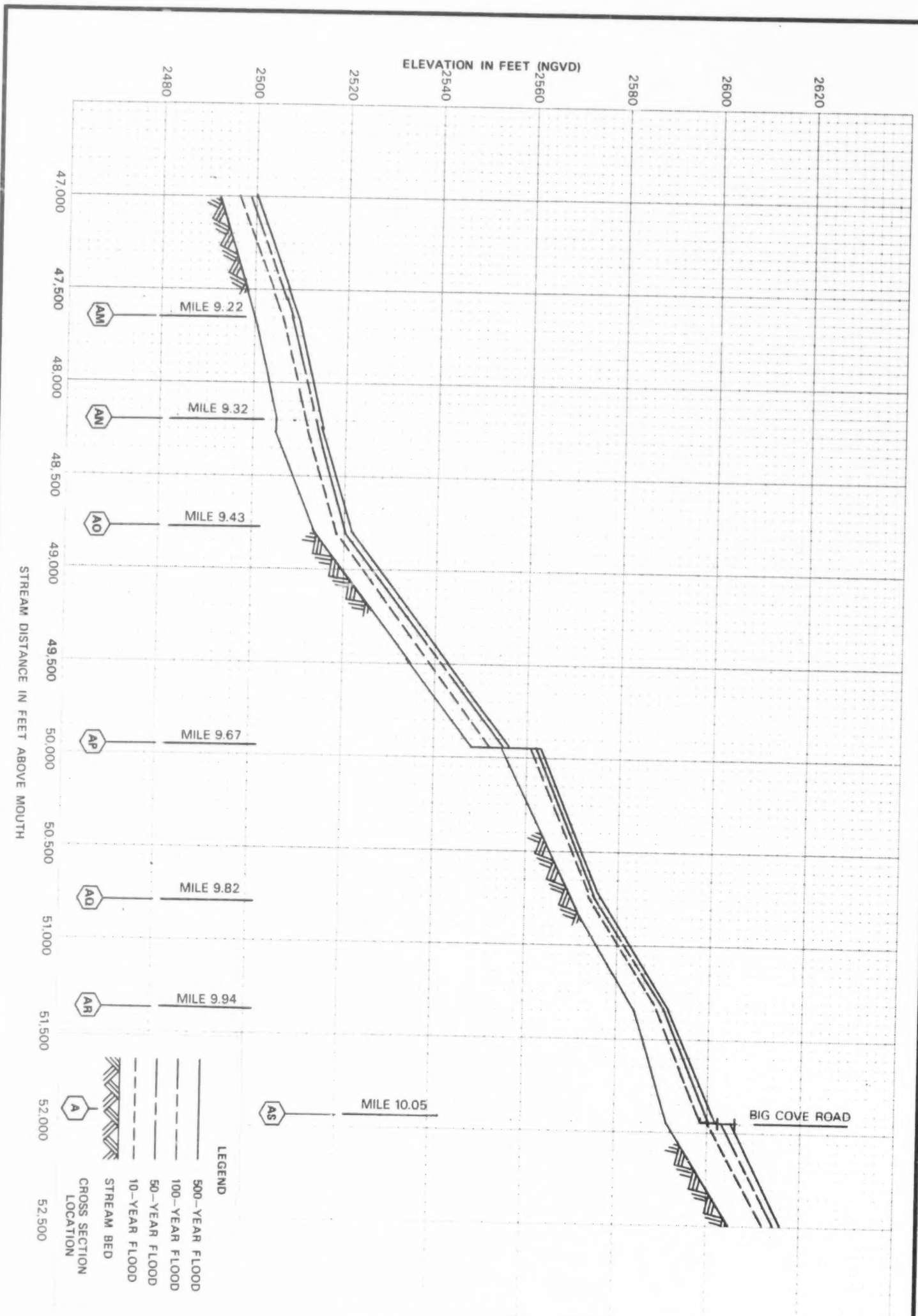
FEDERAL EMERGENCY MANAGEMENT AGENCY

EASTERN BAND OF CHEROKEE INDIANS, NC

(SWAIN, JACKSON, GRAHAM, CHEROKEE, AND HAYWOOD COS.)

FLOOD PROFILES

RAVEN FORK



17P

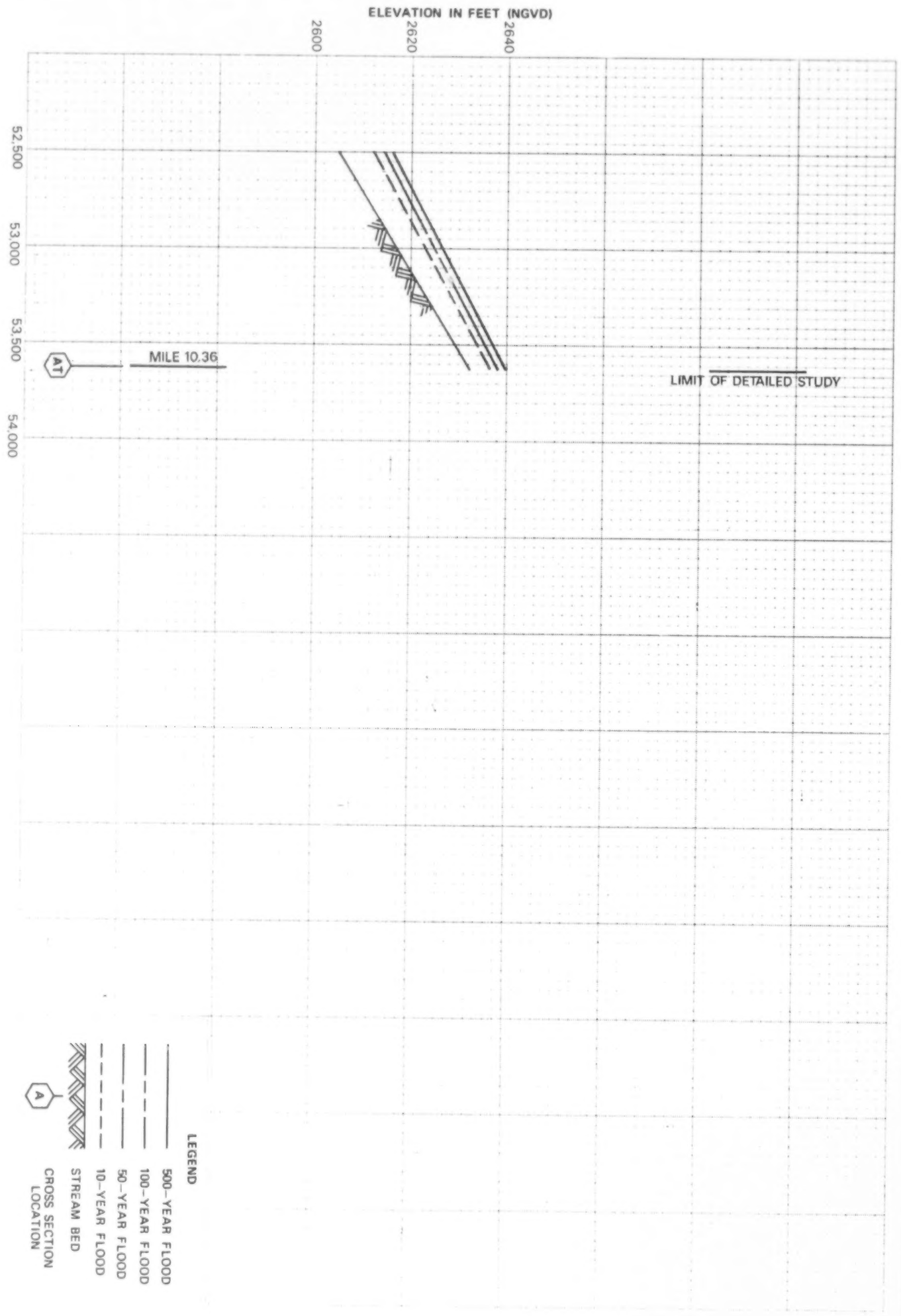
FEDERAL EMERGENCY MANAGEMENT AGENCY

EASTERN BAND OF CHEROKEE INDIANS, NC

(SWAIN, JACKSON, GRAHAM, CHEROKEE, AND HAYWOOD COS.)

FLOOD PROFILES

RAVEN FORK



18P

FEDERAL EMERGENCY MANAGEMENT AGENCY

EASTERN BAND OF CHEROKEE INDIANS, NC
(SWAIN, JACKSON, GRAHAM, CHEROKEE, AND HAYWOOD COS.)

FLOOD PROFILES

RAVEN FORK